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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* FUFANG ZHA and ANTHONY JAMES STUBBS

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Appeal 2008-6007  
Application 10/774,041  
Technology Center 3600

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Decided:<sup>1</sup> March 18, 2009

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Before CHARLES F. WARREN, TERRY J. OWENS, and  
CATHERINE Q. TIMM, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL  
STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-13 and 25, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

*The Invention*

The Appellants claim a method for cleaning a membrane filtration module. Claim 1 is illustrative:

1. A method for cleaning a membrane filtration module, the module comprising at least one membrane located in a feed-containing vessel, the membrane comprising a permeable wall, the method comprising:

conducting a filtration operation wherein a feed is applied to a first side of the permeable wall and a filtrate is withdrawn from a second side of the permeable wall;

suspending the filtration operation;

performing a cleaning process on the permeable wall to dislodge a contaminant therefrom into a liquid surrounding the membrane;

forming a gas-containing region on the first side of the permeable wall;

sealing the feed-containing vessel;

pressurizing a gas within the gas-containing region; and

opening the feed-containing vessel to atmosphere, whereby the gas-containing region expands and produces a sweep of the feed-containing vessel to remove the liquid containing the dislodged contaminant.

*The References*

|         |           |               |
|---------|-----------|---------------|
| Sunaoka | 5,209,852 | May 11, 1993  |
| Beck    | 6,159,373 | Dec. 12, 2000 |

*The Rejections*

The claims stand rejected as follows: claims 1-13 under the doctrine of obviousness-type double patenting over claims 1-12 and 19-23 of copending Application 10/572,893 in view of Sunaoka; claims 1-13 and 25

under 35 U.S.C. § 102(b) or, in the alternative, under 35 U.S.C. § 103 over Sunaoka; and claims 1-4, 9-13, and 25 under 35 U.S.C. § 103 over Beck.

### OPINION

We affirm the rejection under the doctrine of obviousness-type double patenting and the rejection under 35 U.S.C. § 103 over Sunaoka, and we reverse the rejections under 35 U.S.C. § 102(b) over Sunaoka and under 35 U.S.C. § 103 over Beck.

*Rejection of claims 1-13 under the doctrine of  
obviousness-type double patenting over claims  
1-12 and 19-23 of copending Application  
10/572,893 in view of Sunaoka*

The Appellants do not challenge the obviousness-type double patenting rejection. Hence, we summarily affirm that rejection.

*Rejections of claims 1-13 and 25 under  
35 U.S.C. § 102(b) over Sunaoka*

### *Issue*

Have the Appellants shown reversible error in the Examiner's determination that Sunaoka discloses, expressly or inherently, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall?

### *Findings of Fact*

Sunaoka discloses a process for scrubbing iron oxide particles off of the outer surfaces of porous hollow fiber membranes in a hollow fiber

membrane module (1) in a filter column (9) wherein, after compressed air is bubbled through inflow condensate water to remove relatively coarse, hard, fine particles from the outer surfaces of the membranes (col. 7, l. 46 – col. 8, l. 62), waste water is drained from the filter column by one of the following two procedures (col. 8, l. 63 – col. 9, l. 6):

[W]ith the valve 23 [Fig. 2] left open, the valve 22 is closed and the valve 21 is opened to drain, via the drain piping 18, part or all of the waste water containing iron oxide particles dispersed therein and including relatively coarse, hard, fine particles. This step of draining the waste water makes use of a water head. Alternatively, compressed air may be charged into the filter column 9 via the air discharge piping 17, the compressed air charge piping 15B or the water replenishment piping 19 to utilize the pressure of the compressed air to effect quick draining of the waste water.

#### *Analysis*

“Anticipation requires that every limitation of the claim in issue be disclosed, either expressly or under principles of inherency, in a single prior art reference.” *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1255-56 (Fed. Cir. 1989).

The Appellants argue: “Sunaoka makes no inference or teaching that valve 21 is initially closed when compressed air is used to enhance drain down. Nor is there any inherent requirement for valve 21 to be closed if compressed air is used” (Br. 5).

The Examiner argues that “Sealing the tank (feed containing vessel) before pressurizing would be implied by the reference. [emphasis added in the examiner[s] answer] without which the vessel would not hold the pressure” (Ans. 6), and that “[w]ith the Sunaoka system, even if the drain

valve is opened before commencing pressurization, the liquid in the tank would provide the seal required for pressurizing” (Ans. 14).

The Examiner has not established that Sunaoka discloses, expressly or inherently, opening compressed air inlet valve 23 before opening drain valve 21. Sunaoka is silent as to the order of opening the valves when using compressed air. Furthermore, the Appellants’ claim 1, which is the sole independent claim, requires that “the gas-containing region expands and produces a sweep of the feed-containing vessel”. The Examiner has not established that if drain valve 21 is opened before compressed air inlet valve 23 and the outlet is sealed by the liquid in the filter column, the pressure in the filter column necessarily will be sufficient for the air-containing region to expand such that it produces a sweep of the filter column. The air pressure could be sufficiently low that the air steadily pushes out the liquid but does not expand such that a sweep is produced.

*Conclusion of Law*

The Appellants have shown reversible error in the Examiner’s determination that Sunaoka discloses, expressly or inherently, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall.

*Rejections of claims 1-13 and 25 under  
35 U.S.C. § 103 over Sunaoka*

*Issue*

Have the Appellants shown reversible error in the Examiner's determination that Sunaoka would have rendered prima facie obvious, to one of ordinary skill in the art, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall?

*Analysis*

The Appellants argue that "[e]ven assuming *arguendo* that any compressed air supplied by Sunaoka to the tank inherently forms a gas-containing region in the tank, Sunaoka still fails to disclose pressurizing a gas within the gas-containing region as required by independent claim 1" (Reply Br. 7).

The Examiner finds that when Sunaoka drains the filter column without using compressed air (col. 8, l. 63 – col. 9, l. 1), valve 23 is opened before drain valve 21 to avoid pulling a vacuum in the filter column (Ans. 13). Since the Examiner's finding is reasonable and the Appellants have not challenged it, we accept it as fact. *See In re Kunzmann*, 326 F.2d 424, 425 n.3 (CCPA 1964). Because Sunaoka's compressed air, when introduced through air discharge piping 17 (col. 9, l. 2), passes through that same valve 23 (Fig. 2), Sunaoka would have led one of ordinary skill in the

art, through no more than ordinary creativity, to likewise open valve 23 to introduce compressed air before opening drain valve 21 to prevent pulling a vacuum in the filter column. *See KSR Int'l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (In making an obviousness determination one “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ”). That compressed air fed to the filter column before the drain valve is opened would tend to build up an air pressure in the filter column which would result in expansion and a sweep of the liquid in the tank to some extent when the drain valve is opened. In view of Sunaoka’s disclosure that the compressed air is to provide quick draining (col. 9, ll. 4-6), one of ordinary skill in the art would have been led, through no more than ordinary creativity, to build up a sufficient air pressure in the filter column to sweep the liquid out of the tank as quickly as desired. That would be so even if drain valve 21 were opened before or at the same time as compressed air inlet valve 23 and the liquid in the filter column sealed the outlet for the pressure buildup.

The Appellants argue that “any compressed air supplied by Sunaoka has necessarily been pre-pressurized, and will only depressurize upon introduction into the tank as the waste water level drops via open valve 21” (Reply Br. 7).

Sunaoka’s disclosure that the water is to be drained quickly (col. 9, ll. 4-6) would have led one of ordinary skill in the art, through no more than ordinary creativity, to continue feeding the compressed air such that there is adequate air pressure in the filter column to sweep the liquid out quickly. *See KSR*, 127 S. Ct. 1741.



The Appellants argue that “it would have been counterintuitive to build pressure in a vessel housing delicate filtration membranes susceptible to damage, particularly considering Sunaoka’s concerns with regard to membrane surface roughening by dispersed coarse particles. (See Sunaoka at col. 5, ll. 27-31)” (Br. 5).

The Appellants have not provided evidence that Sunaoka’s membranes would be damaged by air pressures used to sweep liquid from a vessel containing the membranes, and arguments of counsel cannot take the place of evidence. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984); *In re Payne*, 606 F.2d 303, 315 (CCPA 1979); *In re Greenfield*, 571 F.2d 1185, 1189 (CCPA 1978); *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974). Moreover, Sunaoka’s air pressurization takes place after the relatively coarse, hard, fine particles have been removed from the membrane and become dispersed in the water (col. 8, l. 45 – col. 9, l. 6).

#### *Conclusion of Law*

The Appellants have not shown reversible error in the Examiner’s determination that Sunaoka would have rendered *prima facie* obvious, to one of ordinary skill in the art, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall.

*Rejection of claims 1-4, 9-13, and 25  
under 35 U.S.C. § 103 over Beck*

*Issue*

Have the Appellants shown reversible error in the Examiner's determination that Beck would have rendered prima facie obvious, to one of ordinary skill in the art, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall?

*Findings of Fact*

Beck discloses a method for removing solids from the outside of hollow fibers within a shell, comprising closing the shell outlet (17), draining liquid from the fiber lumens, and using gas to pressurize the lumens through the lumen inlet (18), at which time “[t]he liquid-filled shell is sealed and gas cannot penetrate the porous [hollow fiber] walls even though the gas pressure is now raised well above the normal bubble point of the fibre walls because the liquid within the shell is relatively incompressible” (col. 5, ll. 15-24). The shell outlet then is opened, allowing explosive decompression of the pressurized gas through the hollow fiber walls which dislodges solids from the fiber walls into the feed side liquid (col. 5, ll. 26-31).

*Analysis*

The Appellants argue: “Beck creates a compressed gas containing region within the lumen rather than on the feed-side of the membrane wall. Because the feed side of the tank is full of incompressible liquid and the lumen of the membrane is pressurized with gas, gas will not move through the membrane pores until the feed side is opened” (Br. 6).

The Examiner argues that Beck’s hollow fiber membranes are microporous and highly permeable and, therefore, contrary to Beck’s disclosure (col. 5, ll. 20-24), gas will pass through the fiber walls until the pressures on both sides of the walls become equal (Ans. 18).

The Appellants’ claim 1 requires that the gas-containing region is formed on the feed side of the permeable wall, which corresponds to Beck’s shell side. The Examiner’s argument is that regardless of Beck’s disclosure that, before the shell is opened, the relatively incompressible liquid in the shell side will prevent gas inside the hollow fibers from passing through the hollow fiber walls to the shell side (col. 5, ll. 20-24), such transfer of gas will take place until the pressures inside and outside the hollow fibers are equalized. The Examiner, however, has not provided evidence that Beck’s relatively incompressible fluid on the shell side and solids retained in the fiber walls will not prevent gas inside the lumens from passing through the fiber walls to the shell side, at least during the time period between pressurizing the lumens and opening the shell side. The Examiner has provided mere speculation, and such speculation, particularly when it is contrary to the reference’s disclosure, is not sufficient for establishing a *prima facie* case of obviousness. *See In re Warner*, 379 F.2d 1011, 1017

(CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968); *In re Sporck*, 301 F.2d 686, 690 (CCPA 1962).

The Examiner argues that once Beck's shell is opened, gas will pass through the hollow fiber walls to the shell side and thereby pressurize the shell side (Ans. 19-20).

The Appellants' claim 1 requires "opening the feed-containing vessel to atmosphere, whereby the gas-containing region expands". If there is no gas-containing region until the vessel is opened, then the requirement of opening the vessel whereby the gas-containing region expands cannot be met.

#### *Conclusion of Law*

The Appellants have shown reversible error in the Examiner's determination that Beck would have rendered *prima facie* obvious, to one of ordinary skill in the art, a method for cleaning a membrane filtration module, comprising pressurizing a gas within a gas-containing region on the feed side of a permeable wall in a feed-containing vessel, sealing the feed-containing vessel, and opening the feed-containing vessel to atmosphere such that the gas-containing region expands and produces a sweep of the feed-containing vessel to remove liquid which contains contaminant that has been dislodged from the permeable wall.

#### DECISION/ORDER

The rejections of claims 1-13 under the doctrine of obviousness-type double patenting over claims 1-12 and 19-23 of copending Application 10/572,893 in view of Sunaoka, and claims 1-13 and 25 under 35 U.S.C. § 103 over Sunaoka are affirmed. The rejections of claims 1-13

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Application 10/774,041

and 25 under 35 U.S.C. § 102(b) over Sunaoka, and claims 1-4, 9-13, and 25 under 35 U.S.C. § 103 over Beck are reversed.

It is ordered that the Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

PL Initial:  
sld

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